

WHAT IS CLAIMED IS:

1           1. A suspension assembly including a load beam and a flexure supporting  
2 a slider, said flexure comprising:

3               a first supporting area connected to said load beam on a leading end side;  
4               a second supporting area connected to said load beam on a supporting end  
5 side;

6               a flexure tongue provided with a supporting area of said slider, a dimple  
7 contact point, and a leading edge;

8               a metal layer including:

9               a first loop spring structure extending from said first supporting area so as to  
10 support said flexure tongue and having a parameter for giving stiffness to said flexure tongue;  
11 and

12               a second loop spring structure extending from said second supporting area so  
13 as to support said flexure tongue and having a parameter for giving stiffness to said flexure  
14 tongue, a value of said parameter being selected in such a manner that said second loop  
15 spring structure gives a stiffness smaller than the stiffness said first loop spring structure  
16 gives to said flexure tongue; and

17               a wiring layer laminated on said metal layer in said second supporting area  
18 and extendedly branching from said second supporting area toward said slider.

1           2. The suspension assembly according to claim 1, wherein said first loop  
2 spring structure and said second loop spring structure constitute a pair of strip-shaped arms  
3 each formed of the metal layer.

1           3. The suspension assembly according to claim 2, wherein each of said  
2 parameters of said first and second loop spring structures is selected as one or a combination  
3 of two or more from the group consisting of a material, a path length, a thickness, a width,  
4 and a path shape of the strip-shaped arms formed of said metal layer.

1           4. The suspension assembly according to claim 2, wherein said metal  
2 layer is a stainless steel having a thickness ranging from about 0.015 mm to 0.025 mm.

1           5. The suspension assembly according to claim 4, wherein the path length  
2 of said second loop spring structure is about 1.2 times or more as long as the path length of  
3 said first loop spring structure.

1                   6.       The suspension assembly according to claim 4, wherein either the  
2 width of said first loop spring structure or the width of said second loop spring structure is  
3 about 0.150 mm or less.

1                   7.       The suspension assembly according to claim 4, wherein said first  
2 supporting area is connected to said load beam at a first fixing point passing through a center  
3 line of said load beam, said second supporting area is connected to said load beam at a second  
4 fixing point passing through a center line of said load beam, the pair of strip-shaped arms  
5 constituting said first loop spring structure extends from an area near said first fixing point in  
6 said first supporting area, and the pair of strip-shaped arms constituting said second loop  
7 spring structure extends from an area near said second fixing point in said second supporting  
8 area.

1                   8.       The suspension assembly according to claim 7, wherein a distance  
2 from said dimple contact point to said second fixing point is about 1.5 times or more as long  
3 as a distance from said first fixing point to said dimple contact point.

1                   9.       The suspension assembly according to claim 7, wherein the distance  
2 from said first fixing point to said dimple contact point is about 1.25 mm or less.

1                   10.      The suspension assembly according to claim 1, wherein said first loop  
2 spring structure and said second loop spring structure support said flexure tongue at a point  
3 on a side of the leading edge in relation to a center of the supporting area of said slider.

1                   11.      The suspension assembly according to claim 1, wherein said first loop  
2 spring structure and said second loop spring structure are provided with a common portion  
3 and said common portion, instead of said first loop spring structure and said second loop  
4 spring structure, supports said flexure tongue.

1                   12.      The suspension assembly according to claim 1, wherein said wiring  
2 layer includes a copper layer and a dielectric layer.

1                   13.      The suspension assembly according to claim 12, wherein a thickness of  
2 said metal layer ranges from about 0.015 mm to 0.025 mm, a thickness of said dielectric layer  
3 ranges from about 0.005 mm to 0.020 mm, and a thickness of said copper layer ranges from  
4 about 0.005 mm to 0.020 mm.

1                   14.    The suspension assembly according to claim 1, wherein said dimple  
2 contact point is given as a contact portion between a dimple formed on said load beam and  
3 said flexure tongue.

1                   15.    The suspension assembly according to claim 1, wherein said dimple  
2 contact point is given as a contact portion between a dimple formed on said flexure and said  
3 load beam.

1                   16.    The suspension assembly according to claim 1 further comprising a  
2 limiter, formed of part of said metal layer, extending from said flexure tongue.

1                   17.    A suspension assembly including a load beam and a flexure connected  
2 to said load beam and supporting a slider, said flexure comprising:

3                   a flexure tongue provided with a supporting area of said slider;

4                   a first spring structure supporting a first supporting area connected to said load  
5 beam on a leading end side and said flexure tongue in such a manner as to extend from said  
6 first supporting area for giving a dominant stiffness to said flexure tongue;

7                   a second spring structure supporting a second supporting area connected to  
8 said load beam on a supporting end side and said flexure tongue in such a manner as to  
9 extend from said second supporting area for giving an auxiliary stiffness to said flexure  
10 tongue; and

11                  a wiring layer laminated on said metal layer in said second supporting area  
12 and extendedly branching from said second supporting area toward said slider.

1                   18.    The suspension assembly according to claim 17, wherein a stiffness  
2 given by said second spring structure to said flexure tongue is about 40% or less of a stiffness  
3 given by said first spring structure and said second spring structure to said flexure tongue.

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1                   19.    The suspension assembly according to claim 18, wherein said stiffness  
2 is a pitch stiffness or a peel stiffness of said flexure tongue.

1                   20.    A suspension assembly including a load beam and a flexure provided  
2 with a metal layer and supporting a slider, said flexure comprising:

3                   a supporting area composed of said metal layer and supported by said load  
4   beam;

5                   a flexure tongue including a supporting area of said slider, a dimple contact  
6   point, and a leading edge, and formed of part of said metal layer; and

7                   a supporting structure extending from the supporting area supported by said  
8   load beam for supporting said flexure tongue at a position on a side of said leading edge in  
9   relation to a center of a mounting position of said slider.

1                   21.    The suspension assembly according to claim 20, wherein said leading  
2   edge is disposed on a leading end side of said load beam with respect to a trailing edge.

1                   22.    The suspension assembly according to claim 20, wherein said leading  
2   edge is disposed on a supporting end side of said load beam with respect to a trailing edge.

1                   23.    A rotary disk storage device, comprising:  
2                   a rotary disk;  
3                   a head reading and writing data from and to said rotary disk, or either reading  
4   or writing data from or to said rotary disk;  
5                   a slider mounted with said head;  
6                   a suspension assembly supporting said slider; and  
7                   an actuator mechanism supporting said suspension assembly, said suspension  
8   assembly being one as recited in claim 1.

1                   24.    The rotary disk storage device according to claim 23, further  
2   comprising a ramp in which said slider is retracted.

1                   25.    The rotary disk storage device according to claim 23, wherein said  
2   actuator mechanism turns about a pivot shaft above a surface of said rotary disk.

1                   26.    A rotary disk storage device, comprising:  
2                   a rotary disk;  
3                   a head reading and writing data from and to said rotary disk, or either reading  
4   or writing data from or to said rotary disk;  
5                   a slider mounted with said head;  
6                   a suspension assembly supporting said slider; and

7 an actuator mechanism supporting said suspension assembly, said suspension  
8 assembly being one as recited in claim 17.

1                           27. The rotary disk storage device according to claim 26, further  
2 comprising a ramp in which said slider is retracted.

1                   29. A rotary disk storage device, comprising:  
2                   a rotary disk;  
3                   a head reading and writing data from and to said rotary disk, or either reading  
4 or writing data from or to said rotary disk;  
5                   a slider mounted with said head;  
6                   a suspension assembly supporting said slider; and  
7                   an actuator mechanism supporting said suspension assembly, said suspension  
8 assembly being one as recited in claim 20.